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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/812,723	03/20/2001	James A. Laugharn JR.	BMA-008	2606

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EXAMINER
SOOHOO, TONY GLEN

ART UNIT	PAPER NUMBER
1723	10

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

TC-10

Offic Action Summary	Application No. 09/812,723	Applicant(s) LAUGHARN ET AL.	
	Examiner Tony G Soohoo	Art Unit 1723	

-- Th MAILING DATE of this communication appears on the cover sh et with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-150* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-150* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

NOTE: Claim 34 is dependent upon claim 36. Correction is needed.

Claim 77 is dependent upon claim 763. Correction is needed.

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

Applicant is required to elect one species of the invention and one subspecies of the invention and one subspecies-indent of each subspecies for an election for examination.

2. If applicant believes that all of the indents under a subspecies should be examined together whereas each subspecies-indent are obvious variants over one another thus are not patentably distinct, applicant should state this upon the record.

3. If applicant believes that all the subspecies should be examined together whereas each indent are obvious variants over one another thus are not patentably distinct, applicant should state this upon the record.

4. If applicant believes that all species should be examined together whereas each indent are obvious variants over one another thus are not patentably distinct, applicant should state this upon the record.

Groups and subgroups and subspecies-indents

1. Genus groups:

A. Species of the invention of acoustic propagated fluid motion:

a) The apparatus and method of selectively *positioning* at least one nucleation feature adapted to interact with the acoustic field to impart the motion to the fluid.

b) The apparatus and method selectively *directing* the acoustic field to at least one nucleation feature located relative to the fluid to impart the motion to the fluid.

2. Subspecies groups

A. Subspecies of : the focal zone:

a) interacting the at least one nucleation feature with the acoustic energy in a focal zone of the acoustic source

b) providing the acoustic field further comprises, providing an unfocussed acoustic field.

B. Subspecies of :the surface

a) wherein first surface is a surface of a microconduit.

b) wherein the first surface is a surface of a microchamber.

c) wherein the first surface is a surface containing one or more active sites.

C. Subspecies of the nucleation feature positioned at a first surface.

a).wherein the at least one nucleation feature includes at least one of a pit, crevice, defect, scratch, groove and ridge in the first surface.

b) wherein the at least one nucleation feature includes at least one of a hydrophobicity, wetability, and surface energy characteristic of the first surface.

c) wherein the at least one nucleation feature includes a plurality of nucleation features forming a texture.

d) wherein the nucleation feature includes an electrochemically or chemically active location.

e) wherein the at least one nucleation feature is suspended in the fluid.

f) wherein the at least one nucleation feature includes at least one of a bead, resin, microsphere and particle.

g) wherein the first surface is a surface of a microconduit.

h) wherein the first surface is a surface of a microchamber.

i) wherein the first surface is a surface containing one or more active sites.

j) wherein the at least one nucleation feature includes a fabric.

k) wherein the at least one nucleation feature includes an electrochemically active site.

l) wherein the nucleation feature includes a distribution of impurities on the first surface.

D. The subspecies of the size of volume of the device

a) fluid has a volume between about 0.1 pl and about 10 ml.

b) fluid has a volume between about 10 nl and about 100 ml.

E. Subspecies of the fluid containment device

a), wherein the fluid is contained in a microchamber.

b) wherein the fluid is contained in a microconduit.

F. Subspecies of acoustic field generation operation parameters

a) wherein the motion imparted to the fluid is of sufficient magnitude to cause a mixing action in the fluid.

b) providing the acoustic source as a component of the microdevice.

c) providing the acoustic field with selected characteristics to promote mixing of only that portion of the fluid that is proximate to the at least one nucleation feature.

d) ceasing to provide an acoustic field to cause the bubble to dissipate to remove the impairment to fluid flow.

e) directing the acoustic field further comprises, providing an acoustic waveform having a frequency between about 10 kHz and about 100 MHz.

f) directing the acoustic field further comprises, providing an acoustic waveform having a frequency between about 100 kHz and about 10 MHz.

g) directing the acoustic field further comprises, providing the acoustic field at a power selected to promote bubble formation at the at least one nucleation feature.

h) directing the acoustic field further comprises, providing the acoustic field at at least one of a duty cycle, duty cycles per burst, amplitude, frequency, time variations in frequency, and time variations in amplitude selected to control cavitation of a bubble at the at least one nucleation feature.

i) providing the acoustic field to cause stable cavitation of a bubble at the at least one nucleation feature.

j) acoustic field interacts with the at least one nucleation feature to promote bubble formation in the fluid, and the method further comprises sensing cavitation and employing the sensed cavitation in a feedback loop to control the bubble formation.

G. Subspecies of the positioning or alternately directing of an acoustic field

a) positioning the at least one nucleation feature relative to an active site, and the step of providing the acoustic field further comprises, providing the acoustic field with selected characteristics to promote mixing of a portion of the fluid proximate to the active site.

b) moving relative positions between the acoustic source and the at least one nucleation feature to alter the motion imparted to the fluid.

c) positioning at least one nucleation feature relative to each of an array of active sites to impart a particular motion to fluid proximate to each of the array of active sites.

d) selectively positioning the at least one nucleation feature further comprises positioning the at least one nucleation feature to effect a direction of the motion imparted to the fluid.

e) selectively locating the nucleation feature further comprises, locating the at least one nucleation feature on or in at least the first surface, and the step of providing the acoustic field to the fluid further comprises providing the acoustic field to the fluid with selected characteristics to form a bubble proximate to the nucleation feature to impair fluid flow in a microconduit.

f) selectively positioning at least one nucleation feature further comprises selectively positioning a plurality of nucleation features, and the method further comprises varying

a relative position between the acoustic source and the plurality of nucleation features to time vary a motion imparted to a fluid.

e) providing the acoustic field selectively to each of the plurality of regions to cause the constituent to flow from the first region through a remainder of the plurality of regions.

f) providing the acoustic source further comprises positioning the acoustic source in direct contact with a fluid.

g) providing the acoustic source further comprises, attaching the acoustic source to an outer surface of a microdevice.

h) providing the acoustic source further comprises positioning the acoustic source in direct contact with the fluid.

i) providing the acoustic source as a component of the microdevice.

j) providing the acoustic field with selected characteristics to promote mixing of only that portion of the fluid that is proximate to the at least one nucleation feature

k). positioning the at least one nucleation feature relative to an active site, and the step of providing the acoustic field further comprises, providing the acoustic field with selected characteristics to promote mixing of a portion of the fluid proximate to the active site.

l) moving relative positions between the acoustic source and the at least one nucleation feature to alter the motion imparted to the fluid.

H. Subspecies number of acoustic sources

a) a single acoustic source

b) providing an acoustic source further comprises providing a plurality of acoustic sources.

I. Subspecies of fluid

a) a non-biological sample

b) constituent is a biological sample

J. Species of direction of an acoustic field

a) at least one nucleation feature is located relative to each of an array of active sites, and the step of directing the acoustic field further comprises, directing the acoustic field to array of active sites to impart a particular motion to fluid proximate to each of the array of active sites.

b) directing the acoustic field further comprises selectively directing the acoustic field to the at least one nucleation feature included in the first surface with selected characteristics to form a bubble proximate to the nucleation feature to impair fluid flow in the microconduit.

c) directing the acoustic field further comprises, focusing the acoustic field to the at least one nucleation feature.

d) directing the acoustic field further comprises, adjusting a relative position between the acoustic source and the at least one nucleation feature to bring the at least one nucleation feature within a focal zone of the acoustic source

e) directing the acoustic field further comprises, time varying a relative position between the acoustic field and the plurality of nucleation features to time vary the motion imparted to the fluid.

f) the step of directing the acoustic field further comprises, employing block to block the acoustic field from locations in the fluid.

g) step of directing the acoustic field further comprises, employing reflectors to direct the acoustic field to the at least one nucleation feature.

h) selectively directing the acoustic field at particular ones of the plurality of nucleation features to effect a direction of the motion imparted to the fluid.

i) providing the acoustic field selectively to each of the plurality of regions to cause the constituent to flow from the first region through a remainder of the plurality of regions.

5. Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, a single discloses sub-species, and a single subspecies-indent for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claims appear generic to both the independent and distinct inventions of positioning and directing an acoustic field.

6. Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

7. Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

8. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

9. A written requirement is made so that applicant may have sufficient time to fully review all 150 claims in response to this requirement, and to fully argue each claim and

point out the relationships between the groups of claims in which applicant considers as being appropriately grouped together for examination.

10. Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony G Soohoo whose telephone number is (703) 308-2882. The examiner can normally be reached on 7:00 AM - 5:00 PM, Tues. - Fri.. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Tony G Soohoo
Primary Examiner
Art Unit 1723

tgs